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STATISTICAL BULLETIN
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CAUSES OF THE RECENT DECLINE IN TUBERCULOSIS AND OUTLOOK FOR THE FUTURE.

In an address delivered before the National Tuberculosis Association at its annual meeting in Santa Barbara, Calif., June 20, Dr. L. I. Dublin, Statistician of the Metropolitan Life Insurance Company, came out strongly for the view that the decline in the tuberculosis rate of the last two decades is, in large measure, to be credited to the organized campaign against tuberculosis which has been carried on by official and non-official agencies during this period. The address was a direct answer to those who have from time to time questioned the value of the anti-tuberculosis campaign and who have looked to the working of natural selection and of other influences not under human control as probably the most significant factors in the fall of the death rate. The issue as drawn by the speaker was clear cut.

The campaign against tuberculosis on the *preventive* side has fortunately been of the widest possible range. It has been based on the widely accepted principle that this infection, which is almost universal, need not cause active disability and death if the resistance of the individual is kept up to a high level; also, that those who have broken down with the disease may in many instances be restored to working capacity by treatment which raises the level of resistance. The campaign has, therefore, emphasized the importance of personal hygiene. This is the cornerstone of preventive tuberculosis work. Sufficient rest, adequacy of nourishing food, of recreation and of other influences which promote happiness, have been advocated to the people in a broadcast campaign of education over many years.

There is to be credited to the *curative* side of the anti-tuberculosis campaign the restoration to health of hundreds of thousands of persons all over the world, who have been from time to time seriously sick with tuberculosis and whose lives have been extended through the sanatorium or hospital care advocated, and often provided, by the anti-tuberculosis forces. The more intelligent and effective care of patients at home has also been made possible through the activity of the tuberculosis agencies and especially through the teachings of public health nurses. The public health nurse, the clinics and dispensaries and, finally, the hospitals and sanatoria, constitute a chain of community defense against tuberculosis whose effectiveness can no longer be questioned. It is necessary only to follow up the records of persons who have attended such institutions to know that their lives have been lengthened. What lengthens life reduces the death rate.

What, after all, has misled those who have belittled the anti-tuberculosis campaign has been the rather striking fact that the decline in the death rate of this disease antedates the tuberculosis campaign as at present organized, and even, in fact, Koch's discovery of the tubercle bacillus. The records of England and of Massachusetts show, to be sure, a decline in the tuberculosis rate of marked extent even in the early fifties of the last century, when health departments had hardly begun to recognize that tuberculosis was a public health problem. This well-known fact should not, however, militate against the evidence on the value of the present campaign. It, in fact, strengthens rather than weakens the evidence.

The present campaign emphasizes primarily the value of increased well-being for the individual. The last half of the nineteenth century was a period of tremendous improvement in the economic and social status of the great mass of the industrial population of the world. Reform laws, both in England and America, carrying with them sharp reductions in the hours and conditions of labor; housing and other sanitary improvements, the concomitant rise in the standard of living, the spread of education, the quickened intelligence of the public in matters of hygiene—all of these made the lot of the average Englishman and the average worker in America better than that of his parents and grandparents. All of this has meant greater resistance to breakdown from tuberculous disease. That is, in fact, all that is claimed for the anti-tuberculosis work of today.

It is easy to understand the sharp decline of the pre-campaign period in view of the enormous waste of human life due to social

mal-adjustments and to the general misery of the population brought about by the growth of cities and the development of machine industry in the first part of the nineteenth century. Toward the close of that century, conditions had so far improved and the death rate declined so much that it has taken intensive effort to accelerate the effect of economic forces. As the rate continues to go down, it is conceivable that more and more obstacles will have to be overcome to obtain further striking results in tuberculosis control, unless modern medicine shall discover a specific for this condition.

The speaker said that not *all*, but a large part, of the credit for the declining tuberculosis death rate could be assigned to the anti-tuberculosis movement. He said that no one knew *all* the facts on the causes of the reduced prevalence of the disease. It is not necessary to deny that the high death rates in former years may have had a selective effect and eliminated family groups unusually disposed to breakdown and death from tuberculosis. But this element in tuberculosis mortality was of minor importance, and in the present lack of informing data, could not be reasonably estimated.

It would be unreasonable to deny that there are persons so constituted that even under favorable living and hygienic conditions they become seriously sick with tuberculosis and do not respond to any treatment now known to the medical profession. But such a group composes, probably, a very small part of the whole population. What the anti-tuberculosis movement has attempted to do is to modify the life and work habits of the great mass of persons of average endowment by inheritance; persons who knowingly or otherwise misuse their bodily economy and thus needlessly shorten their life-span.

With the continued rise in the level of general intelligence and of economic well-being, the amount of control over tuberculosis will be increased. What may happen in the future is indicated by the phenomenal drop in the tuberculosis death rate during very recent years, when the standard of living among wage-earners rose sharply. Better homes, higher real wages, more time for rest and recreation, and intelligence to utilize to the full these helps to better general health, have reduced the tuberculosis death rate of the wage-working population. That there will be further fundamental progress for the wage-earner is suggested by the fact that eonomic gains once made by the industrial population liave really never permanently receded. The underlying trend for the wage-worker has been upward; and with

this rise in well-being has come and will continue to come a decline in tuberculosis mortality. The anti-tuberculosis campaign itself is an index of the higher intelligence and the social conscience which characterize an advanced civilization.

GAIN IN EXPECTATION OF LIFE IN THE UNITED STATES DURING 1921.

The mortality rate among the population of the United States Registration States during 1921 was the lowest, and the expectation of life the greatest on record. At birth, the expected after-life span was 58.01 years, an increase of three and one-third years over the figure prevailing in 1920. The significance of the extraordinarily favorable health conditions prevailing in that year will be seen by comparing this gain in expectancy within *one* calendar year with the gain of two and three-fourth years in the *decade* 1910-1920. The average life-span was extended more during 1921 than during the whole of the preceding ten years!

Among males, the gain in the expectation at birth during 1921 was greater than for females. The male population of the United States showed an increase of 4.11 years in the life-span as compared with a gain of 3.99 years for females.

Gains in life expectancy were most pronounced at the younger ages. From ages 7 to 12, the increase was 2.19 years. Even up to age 17, the life-span was lengthened more than two years over the figures prevailing in 1920. The more favorable balance of added years of after-lifetime among males than among females at birth resulted almost entirely from the more rapid decline of the infant death rate for males. After infancy, females in the population showed a greater gain in life expectancy, except, at the most advanced ages.

In making any analysis or interpretation of the life expectations of 1921 and 1920 it should always be remembered that each set of figures relates to *a single year only*. Hence they are merely descriptive of the effect on the expectation of life of the public health record of each of these years. They indicate how considerable will be the addition to the life span in the present decade if the decline in the death rate continues. The 1922 health record was almost as good as that for 1921; and present indications are that 1923 will actually show improvement over 1922; it may even excel the 1921 record which was the best ever registered.

A comparison of the facts, by sex, for selected ages is shown in the table below:

Expectation of Life in United States Registration States, 1921 and 1920, by Sex.

Age	Total			Males			Females		
	1921	1920	Gain 1921-1920	1921	1920	Gain 1921-1920	1921	1920	Gain 1921-1920
0	58.01	54.66	3.35	57.02	52.91	4.11	59.06	55.07	3.99
7	57.77	55.58	2.19	57.34	55.30	2.04	58.23	55.86	2.37
12	53.41	51.22	2.19	53.03	50.98	2.05	53.81	51.46	2.35
17	49.05	46.93	2.12	48.70	46.72	1.98	49.44	47.18	2.26
22	44.95	43.00	1.95	44.59	42.79	1.80	45.34	43.22	2.12
32	36.89	35.52	1.37	36.46	35.13	1.33	37.34	35.90	1.44
42	28.90	27.98	.92	28.47	27.56	.91	29.35	28.40	.95
52	21.26	20.50	.76	20.87	20.12	.75	21.67	20.88	.79
62	14.44	13.78	.66	14.12	13.47	.65	14.74	14.06	.68
72	8.97	8.36	.61	8.75	8.11	.64	9.19	8.53	.66
82	5.19	4.73	.46	5.06	4.46	.60	5.29	4.73	.56
92	2.96	2.69	.27	2.92	2.42	.50	3.02	2.54	.48
102	1.72	1.67	.05	1.64	1.35	.29	1.83	1.91	.08*

*Loss.

SMALLPOX IN AMERICAN STATES AND CANADIAN PROVINCES, 1922.

The increasing virulence of smallpox infection in the United States during 1922 is shown by the figures which have just been made available by the registrars of American states and Canadian provinces. During 1922, among 33,735 smallpox cases, there occurred 743 deaths, or 2.2 deaths per 100 cases. This latter figure is more than four times the case-fatality rate prevailing in the same group of states and provinces during 1921 and 1920. The rise in the case-fatality rate was confined to areas within the United States. The most pronounced increase occurred in the Mountain States, especially in Arizona, where a case-fatality of 28.6 per cent. was recorded in 1922, as compared with 2.1 per cent. in 1921. In Colorado, 20.7 per cent. of the reported smallpox cases died; in 1921, only 1.7 per cent. of the cases terminated fatally. A significant increase in the lethal rate occurred also in Missouri: from 6.3 deaths per 100 cases in 1921, to 12.5 in 1922. In the State of Alabama, 5.5 per cent. of the smallpox cases died and in Pennsylvania, 5.9 per cent. in 1922.

While the number of cases declined from 109,115 in 1921 to 33,735 in 1922, the number of deaths rose from 543 to 743 in the group of states and provinces where complete records were available for three consecutive years. The decline in the case-prevalence of smallpox is overshadowed by the marked increase in the number of deaths.

While the increase in the virulence of smallpox has been confined largely to a group of western states, this has an important bearing on the safety of the rest of the population in the United States and Canada. There is no certainty that this virulent type of the disease will not spread to populations in the eastern section of the country, especially to those states where by reason of anti-vaccination propaganda, there has been a steady rise in the number of unprotected persons in the population. Among such populations, we may again have an experience similar to that which occurred in Montreal, in 1885-1886. Following the introduction of one case of smallpox from Chicago, the disease spread through the city and within nine months, thousands of cases occurred and 3,164 persons died. Vaccination, performed under conditions prescribed by the United States Public Health Service, and the state, provincial, and municipal departments of health, is the only certain protection against the severe type of the disease which seems now to have obtained a firm foothold in certain of our American states.

Smallpox Cases and Deaths in American States and Canadian Provinces, 1920 to 1922.

Area	Cases			Deaths			Deaths per 100 Cases		
	1922	1921	1920	1922	1921	1920	1922	1921	1920
Total—U. S. & Canada*..	33,735	109,115	109,963	743	543	551	2.2	.5	.5
United States*.....	32,119	104,493	103,589	737	523	514	2.3	.5	.5
Canada*.....	1,616	4,622	6,374	6	20	37	.4	.4	.6
New England States.....	499	333	373	6	1	1	1.2	.3	.3
Maine.....	36	92	241	0	0	0	0	0	0
New Hampshire.....	1	19	0	0	0	0	0	0	0
Vermont.....	13	177	101	0	1	0	0	.6	0
Massachusetts.....	2	37	29	0	0	1	0	0	3.4
Rhode Island.....	9	1	1	‖	0	0	‖	0	0
Connecticut.....	447	8	2	6	0	0	1.3	0	0
Middle Atlantic States...	357	1,098	702	6	2	2	1.7	.2	.3
New York.....	254	631	305	1	1	1	.4	.2	.3
New Jersey.....	18	255	182	0	0	0	0	0	0
Pennsylvania.....	85	212	215	5	1	1	5.9	.5	.5
East North Central States	8,641	30,359	32,006	57	85	69	.7	.3	.2
Ohio.....	2,422	7,286	7,209	5	13	18	.2	.2	.2
Indiana.....	1,082	4,809	5,775	7	21	15	.6	.4	.3
Illinois.....	2,116	8,536	8,536	23	22	16	1.1	.3	.2
Michigan.....	1,231	4,512	4,818	20	12	11	1.6	.3	.2
Wisconsin.....	1,790	5,216	5,668	2	17	9	.1	.3	.2
West North Central States	5,782	26,515	19,993	104	114	49	1.8	.4	.2
Minnesota.....	2,166	9,375	6,333	8	25	15	.4	.3	.2
Iowa.....	749	5,174	3,403	20	‡22	11	2.7	.4	.3
Missouri.....	657	2,982	‖	82	189	28	12.5	6.3	‖
North Dakota.....	710	1,777	549	1	2	2	.1	.1	.4
South Dakota.....	859	2,511	1,673	3	9	8	.3	.4	.5
Nebraska.....	484	3,048	4,135	5	8	10	1.0	.3	.2
Kansas.....	814	4,630	3,900	67	48	3	8.2	1.0	.1
South Atlantic States....	3,772	11,738	12,190	42	74	52	1.1	.6	.4
Delaware.....	0	0	27	0	0	2	0	0	7.4
Maryland.....	17	214	179	3	0	0	17.6	0	0
District of Columbia...	66	66	89	0	0	0	0	0	0
Virginia.....	511	1,874	3,468	0	9	12	0	.5	.3
West Virginia.....	453	2,474	2,592	2	3	2	.4	.1	.1
North Carolina.....	1,409	2,513	2,961	7	21	28	.5	.8	.9
South Carolina.....	342	1,055	†1,118	5	8	†2	1.5	.8	.2
Georgia.....	756	2,191	1,328	21	19	3	2.8	.9	.2
Florida.....	218	1,351	428	4	14	3	1.8	1.0	.7

Smallpox Cases and Deaths in American States and Canadian Provinces, 1920 to 1922 — (*Continued*)

Area	Cases			Deaths			Deaths per 100 Cases		
	1922	1921	1920	1922	1921	1920	1922	1921	1920
East South Central States.	2,432	9,633	9,382	43	69	82	1.8	.7	.9
Kentucky	513	2,367	1,792	1	11	20	.2	.5	1.1
Tennessee	567	‡2,913	3,002	2	10	11	.4	.3	.4
Alabama	623	2,192	1,440	34	33	7	5.5	1.5	.5
Mississippi	729	2,161	3,148	6	15	44	.8	.7	1.4
West South Central States	2,245	3,761	4,466	39	74	188	1.7	2.0	4.2
Arkansas	173	470	789	1	1	5	.6	.2	.6
Louisiana	645	1,419	1,564	2	55	163	.3	3.9	10.4
Oklahoma	‖	2,109	1,812	60	46	13	‖	2.2	.7
Texas	1,427	1,872	2,113	36	18	†20	2.5	1.0	.9
Mountain States	3,529	9,451	10,854	415	69	36	11.8	.7	.3
Montana	636	1,466	1,066	2	4	2	.3	.3	.2
Idaho	241	857	†2,556	1	5	†5	.4	.6	.2
Wyoming	192	486	†911	2	0	0	1.0	0	0
Colorado	1,302	2,606	385	269	44	7	20.7	1.7	1.8
New Mexico	53	110	316	0	1	3	0	.9	.9
Arizona	468	192	176	134	4	5	28.6	2.1	2.8
Utah	578	3,499	5,123	6	10	14	1.0	.3	.3
Nevada	59	235	321	1	1	0	1.7	.4	0
Pacific Coast States	4,862	11,605	13,623	25	35	35	.5	.3	.3
Washington	1,595	4,441	6,146	1	10	18	.1	.2	.3
Oregon	1,141	1,583	2,991	4	4	10	.4	.3	.3
California	2,126	5,581	4,486	20	21	7	.9	.4	.2
Canada	1,616	4,622	6,374	6	20	37	.4	.4	.6
Alberta	67	1,043	536	‖	9	11	‖	.9	2.1
British Columbia	30	108	209	1	0	0	3.3	0	0
Manitoba	173	205	134	0	0	0	0	0	0
New Brunswick	157	118	485	1	0	2	6	0	.4
Nova Scotia	§ 1	§ 87	§ 279	§ 0	§ 0	§ 5	§ 0	§ 0	§1.8
Ontario	977	3,787	5,169	3	18	33	.3	.5	.6
Quebec	279	404	377	1	2	2	.4	.5	.5
Saskatchewan	‖	894	390	‖	3	0	‖	.3	0

*Totals and sub-totals include only States and Provinces having complete records for three years.

†U. S. Public Health Reports, weekly, Aug 5, 1921.

‡U. S. Public Health Reports, weekly, Oct. 31, 1922.

§Year ending Sept. 30. ‖Not Reported.

HEALTH RECORD FOR MAY 1923.

The death rate for the Industrial policyholders declined 7.6 per cent. in May as compared with April. Part of this drop in the mortality was seasonal and, therefore, expected at this time of the year. More important is the fact that the May, 1923, rate was 3 per cent. lower than for the corresponding month of 1922. Altogether the health situation among American and Canadian wage-earners is very satisfactory. In two of the five months of 1923 for which figures are available (March and May), the rate was lower than for 1922.

With the exception of tuberculosis, all of the diseases of chief numerical importance registered lower death rates in May than in April. There was a slight rise in tuberculosis, which was unexpected at this season of the year; but the rate was, nevertheless, lower than for the corresponding month of 1922, and the tuberculosis mortality record for the year, to date, shows a substantial decrease over the first five months of last year. The largest declines recorded in May were those for influenza and pneumonia. These two diseases, nevertheless, are still important factors in the death rate. Twelve hundred and eighty-one deaths were charged to them, which amounts to 11.5 per cent. of the mortality from all causes. Appreciable drops were also recorded in May in the death rates for cancer, cerebral hemorrhage, organic heart disease and Bright's disease.

Among the epidemic diseases the measles situation is the outstanding factor. This disease has been widespread this year, and a sufficient number of deaths have already been recorded to indicate that the rate for 1922 will be the highest recorded for many years. Many deaths from whooping cough are also being recorded and the death rate for this disease is running much higher than in 1922 or 1921; it is, nevertheless, not above the average for the past decade. The diphtheria and scarlet fever rates are running much lower than during the first five months of last year.

The mortality from accidents rose slightly in May and is higher than for the same month of 1922. The same obtains for automobile fatalities.

The death rate for the general population of the large cities of the United States in May was 12.9 per 1,000 estimated population. There was a marked decline as compared with the preceding month, but the mortality was slightly higher than for May a year ago. Reports show increases as compared with April in the case incidence throughout the country of malaria, measles, smallpox and

typhoid fever, with declines for diphtheria, influenza, scarlet fever and whooping cough. Compared with May of last year, there were fewer cases of influenza, malaria, smallpox and typhoid, but considerable increases for measles and whooping cough.

High measles morbidity was reported in May from most of the states. In Michigan the number of cases rose from 1,524 in April to 5,388 in May; corresponding increases in other states were: New York, from 3,982 to 6,788; Alabama, 2,527 to 4,667; Wisconsin, 2,866 to 3,887; in other states smaller rises were recorded. Outstanding instances where the disease has reached epidemic prevalence are St. Paul, Minnesota, which, according to reports, has been passing through the greatest measles epidemic in the history of the city; Montgomery County, Alabama; a number of Louisiana communities, and Delphos and Fostoria, Ohio.

A general falling off of influenza cases is reported throughout the country.

Smallpox appears to be increasing in a number of states. In California, 68 cases were reported in April and 86 in May; in Indiana, the case reports increased from 121 in April to 190 in May and in Wisconsin, from 72 to 130. In the country, as a whole, however, fewer cases of smallpox have been reported this year than last. A section of Philadelphia was quarantined following the discovery of smallpox, and at Cleves, Ohio, it was proposed to vaccinate all the employees of an important industry and also the school children, following the discovery of a number of smallpox cases in the village. In Fort Wayne, Ind., the Central High School was closed on May 10th as the result of the discovery of a smallpox case.

Whooping cough appears to be declining in a majority of the states. Michigan is an exception, as a considerable increase in the case incidence has been recorded.

Eleven cases of Rocky Mountain spotted fever were reported from Montana during the first three weeks of May.

The table below shows the mortality among Industrial policyholders for May, 1923; April, 1923; May, 1922 and for the year 1922.

METROPOLITAN LIFE INSURANCE COMPANY.

Death Rates per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department.

(Annual Basis)

MONTHS OF APRIL AND MAY, 1923, AND OF MAY, 1922

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED			
	May, 1923	Apr., 1923	May, 1922	Year 1922†
TOTAL—ALL CAUSES	932.1	1008.4	960.9	877.2
Typhoid fever	2.9	3.9	3.7	5.6
Measles	16.5	12.5	8.8	4.3
Scarlet fever	5.4	6.5	4.6	4.8
Whooping cough	5.4	6.8	2.3	2.6
Diphtheria	9.8	12.3	12.5	17.8
Influenza	24.4	47.7	20.8	21.5
Tuberculosis (all forms)	121.8	119.0	130.4	113.4
Tuberculosis of resp'y system	111.9	109.0	118.5	102.9
Cancer	69.8	74.6	75.5	71.5
Diabetes mellitus	18.9	21.3	*	17.0
Cerebral hemorrhage	61.5	65.9	62.2	62.4
Organic diseases of heart	133.9	139.3	140.4	126.0
Pneumonia (all forms)	82.9	108.2	81.9	73.3
Other respiratory diseases	14.2	15.7	17.5	13.6
Diarrhea and enteritis	6.4	8.7	7.8	10.7
Bright's disease (chronic nephritis)	72.3	78.3	72.2	69.9
Puerperal state	19.3	18.0	18.4	18.9
Suicides	9.0	7.0	8.2	7.4
Homicides	5.3	6.6	6.0	6.2
Other external causes (excluding suicides and homicides)	57.9	55.1	54.8	57.7
Traumatism by automobile	13.1	11.0	12.3	13.5
All other causes	194.4	201.1	233.1	172.6

*Not available. †Based on provisional estimate of lives exposed to risk in 1922.

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STATISTICAL BULLETIN,
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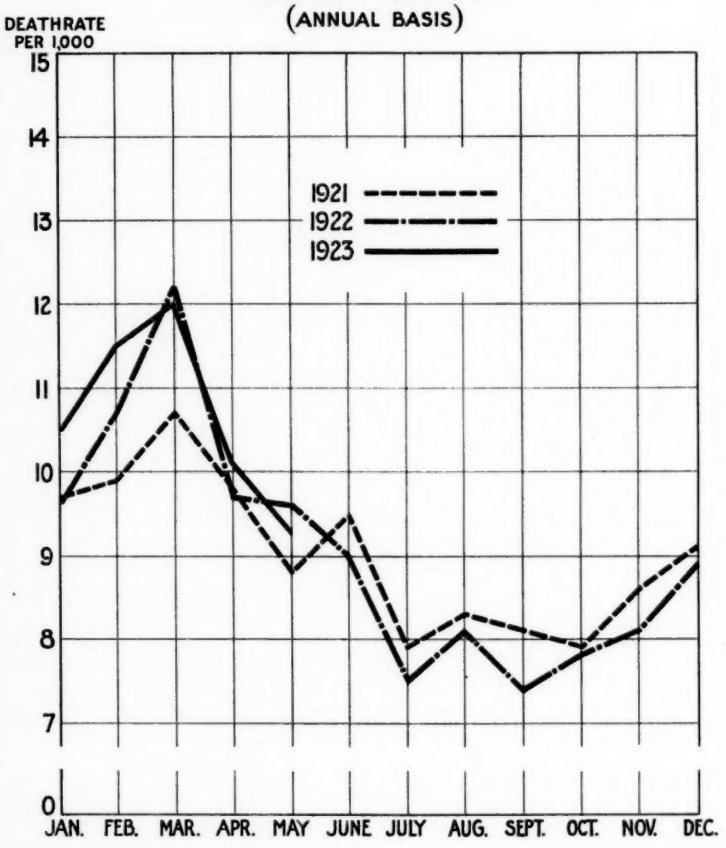
DEATHRATE PER 1,000
in SPECIFIED MONTHS *of*
1921-1922-1923

METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT
(ANNUAL BASIS)



	1921	1922	1923		1921	1922	1923
JAN.	9.7	9.6	10.5	JULY	7.9	7.5	
FEB.	9.9	10.7	11.5	AUG.	8.3	8.1	
MAR.	10.7	12.2	12.0	SEPT.	8.1	7.4	
APR.	9.8	9.7	10.1	OCT.	7.9	7.8	
MAY	8.8	9.6	9.3	NOV.	8.6	8.1	
JUNE	9.5	9.0		DEC.	9.1	8.9	

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